

neither note nor comment in order to be fully appreciated by our scientific readers. On p. 1 we are informed that baryta white (barium sulphate) "consists of 137 equivalents (!) of barium, 32 equivalents of sulphur, and 64 equivalents of oxygen." On p. 3 we are furnished with an elegant test for the detection of free sulphuric acid in baryta white; we are directed to "add a few fragments of loaf-sugar to a largely diluted solution of the pigment, and evaporate to dryness. A black charred residue indicates free sulphuric acid." We are told (p. 7) that calcium imparts a green coloration to the blow-pipe flame. In testing verdigris for sulphate of copper we are informed (p. 21) that "sulphuretted hydrogen will throw down the sulphur present in it." Cœruleum (oxides of tin and cobalt) is stated to be made (p. 26) of "carbonate of soda 15 parts, powdered flint 20, and copper 3." Thénard's cobalt blue is "a salt of calcium calcined with alumina or oxide of tin" (p. 27). Indian yellow (p. 39) is "uriophosphate of lime" identical with "a magnesium salt of a curious acid called euxanthic." In order to see whether cadmium red (p. 47) contains any lead, "mix with white lead (!), boil in water, and add SH_2 to the solution." Red lead is said (p. 55) to undergo a "rapid oxidation" when mixed with sulphuretted hydrogen. Vermilion "must not be used with iodine" (p. 58). When chromate of lead is mixed with sulphide of cadmium, sulphide of lead is formed, and chromium, oxygen, and metallic cadmium are set free (p. 74). The iron in yellow ochre will if mixed with Naples yellow (antimoniate of lead) abstract oxygen from the latter and become deeper in tone (p. 76). Enough of Mr. Standage's chemistry: one line as to the value of his statements as to the theory of chromatics. On p. 81 he is good enough to inform us that from his own knowledge of colour-science he remains "steadfast to the old original theory of red, yellow, and blue being the three primaries."

We should not have devoted so much space to this curious little book if the present issue had been a first edition. But the majority of the extraordinary statements cited above were published by Mr. Standage in a work called the "Artists' Table of Pigments," of which the "Artists' Manual of Pigments" is to be regarded as a revision and enlargement.

OUR BOOK SHELF

American Journal of Mathematics, vol. viii. Nos. 1 and 2. (Baltimore, 1885, 1886.)

THIS volume opens with a memoir by Capt. MacMahon, R.A., on seminvariants, in which the author continues the discussion of the aszygetic seminvariants commenced by him in vol. vi, No. 2 (see also vol. vii. No. 1). Mr. J. Hammond contributes "Syzygy Tables for the Binary Quintic." One table replaces in part the enumeration given by Prof. Cayley in his tenth memoir on Quantics (*Phil. Trans.*, part 2, 1878) and that given by Prof. Sylvester (*Amer. Journ.*, vol. iv. p. 58). The same writer has two papers in No. 2—one "On Perpetuants, with Applications to the Theory of Finite Quantics," this is a subject familiar to the readers of the *Journal* through Prof. Sylvester's brilliant papers, and is handled in the author's usual accurate and clear manner; the second paper is on "The Cubi-quadratic System," and is likewise a following out of previous papers in the *Journal* the size of whose paper is admirably suited for such lengthy and wide tables. P. Seelhoff has two papers

on the theory of numbers, "Prüfung grösserer Zahlen auf ihre Eigenschaft als Primzahlen" and "Nova methodus numeros compositos a primis dignoscendi illorumque factores dignoscendi." The first is a continuation of a paper in vol. iii. No. 3, and puts in the forefront a remark of Mr. Glaisher's: "The process of determining without a table the factors of a number is excessively laborious. Thus to determine, for example, whether the number 8559091 is or is not a prime, would require a long day's work." Upon this the writer remarks "Sehen wir zu!" There are ten pages of tables. The memoir by Dr. Emory McClintock entitled "Analysis of Quintic Equations," is a very interesting and apparently thorough discussion of the subject, with full historic references. Dr. T. Craig contributes a paper "On Linear Differential Equations whose Fundamental Integrals are the successive derivatives of the same function." This paper runs on into No. 2. The same writer closes the number with a memoir "On a Linear Differential Equation of the Second Order." Messrs. E. H. Moore and C. N. Little, in their "Note on Space Divisions," follow on the lines of Pappus's "Ueber die Anzahl der Theile, in welche ein Gebiet k^{ter} Stufe durch n Gebiete $(k-1)^{\text{ter}}$ Stufe getheilt werden kann," and discuss the division of flat space of k dimensions by flat spaces of $k-1$ dimensions. In a "Note on a Roulette" Dr. A. V. Lane discusses that generated by the rolling of an ellipse on a right line, one extremity of the major axis being the generating point. Mr. H. B. Fine contributes a paper "On the Singularities of Curves of Double Curvature," and Mr. J. C. Fields has a notelet, "Proof of the Theorem—the equation $f(z)=0$ has a root where $f'(z)$ is any holomorphic function of z ."

Burma, as it was, as it is, and as it will be. By James George Scott ("Shway Yoe"). (London: George Redway, 1886.)

MR. SCOTT'S position as a competent and instructive writer on Burma was assured by his volume on "The Burman; his Life and Notions," published a few years ago. In this work he showed an intimate knowledge of the habits and modes of thought of the Burmese which could only have been acquired by a mastery of the language and a familiarity with the inner life of the people such as few Europeans can obtain of any Oriental nation. The present work is, no doubt, published in view of recent political events which have naturally attracted public attention especially to Upper Burma. In it the reader will find the whole subject treated in a general way, the first section being devoted to history, the second to geography, the third to "the people," under which head we find information respecting the method of administration, the religion, superstitions, and social habits of the Burmese. It is inevitable that the book should have a somewhat encyclopædic air, but Mr. Scott's entertaining style should gild the pill for the "general reader." Moreover, there are no really popular books in which the comprehensive information here given can be obtained in English. The average reader can hardly be expected to master the large works of Fytche, Yule, Crauford, and others, merely in order to get some accurate information about one small portion of the British Empire. In this respect the book is of a kind more familiar to French than to English readers; but it is much more than a mere catchpenny publication to meet a superficial and temporary demand. Readers of this journal, for example, may find much in it of special interest to them. The sketch of Burmese cosmogony and mythology is very interesting. The story of the forbidden fruit is familiar in Burma, the place of the apple being taken by the seeds of a species of creeper, and the fall being gradual instead of immediate.

Another point of much importance at the present moment is dealt with at comparative length. We refer

to the hill-tribes in the mountainous region to the north of Burma, and especially between Bahmo and Momi. These call themselves by many different names, Chyens, Kyaws, Paloungs, Khamis, Mros, &c., but a closer examination of dialects, and especially of traditions and customs, proves, says Mr. Scott, that they are merely waifs and strays from the four main stocks, Burmese, Peguan, Karens, and Shans. The Salones of the Mergui archipelago, some of the Arakan hill-tribes, and the notorious Kachyens in the north, are apparently exceptions, but all the others belong to one or other of these four families. The Kachyens just mentioned are so called by the Burmese; they call themselves Singpho, or Singpaw, which means simply "men." Ethnologically they are a branch of the Singphos proper, who inhabit the northern Assam hills, and are better known to us by their local names of Gáros and Nagas. Such at least is Mr. Scott's account of them; but it is quite clear that the last word has yet to be said by ethnologists about these and other tribes adjoining our new territory. The last pages of the volume are devoted to an account of the habits, manners, superstitions, &c., of these hill-tribes. The writer would probably be the last to expect a very high position for this volume as one of original research or information; but he may fairly claim to have performed a task of much usefulness and interest in a thorough and workmanlike manner. He has placed within easy reach of his countrymen sound and accurate information about a region for the peace, order, and good government of which they have now assumed the responsibility; and Mr. Scott's own previous writings are mainly responsible for having deprived part at least of the present book of the merit of originality likewise.

Marvels of Animal Life. By Charles Frederick Holder. (London: Sampson Low, Marston, and Co., 1886.)

THE author, during a long residence among coral reefs somewhere on "our southern border"—we have failed to find exactly where—studied very diligently the various forms of marine life abounding in such places, and he seems to have been attracted more especially to the study of the fishes. From the interesting records of these observations to be found in this little volume there can be no doubt that Mr. C. F. Holder has been a close and intelligent student of nature, and he has grouped the observations of others with his own in a manner to make the record fairly interesting reading to a specialist. To the wider field of young students some of the escapes from whales and swordfish will prove even exciting reading, while, so far as we can judge, none of the chapters convey erroneous or exaggerated views of the marvels of animal life. The illustrations, of which there are thirty-one, in the form of plates, are often rather sensational, and the majority of them would hardly be claimed as after nature. The work is sure to be popular, from the very novelty of the subjects about which it treats.

LETTERS TO THE EDITOR

- [The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]
- [The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Integer Numbers of the First Centenary, satisfying the Equation $A^2 = B^2 + C^2$

I HAVE sometimes wished to refer to the principal integer numbers which satisfy the equations $A^2 = B^2 + C^2$, and I have computed all in which the leading numbers rise to and slightly pass the value 100. Perhaps they may interest some of the readers of NATURE.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	5	13	17	25	29	37	41	53	61	65	73	85	89	97	113	145		
B	4	12	15	24	21	35	40	45	60	56	63	55	77	84	80	72	112	144
C	3	5	8	7	20	12	9	28	11	33	16	48	36	13	39	65	15	17

In mechanical applications of these numbers, it is usually desirable to select those in which the proportion $B : C$ differs least from 1. I place, below, the numbers B and C arranged in the order of value of the fraction $\frac{B}{C}$.

No. in order of value of $\frac{B}{C}$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B	21	72	55	4	45	56	15	80	77	12	35	24	63	40	60	84	112	144
C	20	65	48	3	28	33	8	39	36	5	12	7	16	9	11	13	15	17

$\frac{B}{C}$	1.05	1.11	1.14	1.33	1.61	1.70	1.87	2.06	2.14	2.40	2.92	3.43	3.94	4.44	5.45	6.49	7.47	8.49
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Original order	5	16	12	1	8	10	3	15	13	2	6	4	11	7	9	14	17	18
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White House, Greenwich, March 31

G. B. AIRY

The Sunrise Shadow of Adam's Peak, Ceylon

SOME of the phenomena of the shadow of Adam's Peak in the early morning have been remarked by almost every traveller who has visited this island. The mountain rises to a height of 7352 feet as an isolated cone projecting more than 1000 feet above the main ridge to which it belongs. The appearance which has excited so much comment is that just after sunrise the shadow of the Peak seems to rise up in front of the spectator, and then suddenly either to disappear or fall down to the earth.

Various suggestions have been made as to the source of this curious shadow; among others one, which was published in the *Phil. Mag.*, August 1876, that attributed the rise of the shadow to a kind of mirage effect, on the supposition that the air over the low country was much hotter than on the Peak top.

I determined to attempt the discovery of the true nature of this appearance, and was fortunate to see it under circumstances which left no doubt as to the real origin. Through the courtesy and hospitality of Mr. T. N. Christie, of St. Andrew's Plantation, I was able to pass the night on the summit, and to carry up a few necessary instruments.

The morning broke in a very unpromising manner. Heavy clouds lay all about, lightning flickered over a dark bank to the right of the rising sun, and at frequent intervals masses of light vapour blew up from the valley and enveloped the summit in their mist. Suddenly, at 6.30 a.m., the sun peeped through a chink in the eastern sky, and we saw a shadow of the Peak projected on the land; then a little mist drove in front of the